

## Impact of Collieries on Groundwater in Damodar River Basin

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**Abstract :** The industrialization of coal mining and related activities has a significant impact on groundwater in the surrounding areas of the Damodar River. The Damodar River basin, located in eastern India, is known as the "Ruhr of India" due to its abundant coal reserves and extensive coal mining and industrial operations. One of the major consequences of collieries on groundwater is the contamination of water sources. Coal mining activities often involve the excavation and extraction of coal through underground or open-pit mining methods. These processes can release various pollutants and chemicals into the groundwater, including heavy metals, acid mine drainage, and other toxic substances. As a result, the quality of groundwater in the Damodar River region has deteriorated, making it unsuitable for drinking, irrigation, and other purposes. The high concentration of heavy metals, such as arsenic, lead, and mercury, in the groundwater has posed severe health risks to the local population. Prolonged exposure to contaminated water can lead to various health problems, including skin diseases, respiratory issues, and even long-term ailments like cancer. The contamination has also affected the aquatic ecosystem, harming fish populations and other organisms dependent on the river's water. Moreover, the excessive extraction of groundwater for industrial processes, including coal washing and cooling systems, has resulted in a decline in the water table and depletion of aquifers. This has led to water scarcity and reduced availability of water for agricultural activities, impacting the livelihoods of farmers in the region. Efforts have been made to mitigate these issues through the implementation of regulations and improved industrial practices. However, the historical legacy of coal industrialization continues to impact the groundwater in the Damodar River area. Remediation measures, such as the installation of water treatment plants and the promotion of sustainable mining practices, are essential to restore the quality of groundwater and ensure the well-being of the affected communities. In conclusion, the coal industrialization in the Damodar River surrounding has had a detrimental impact on groundwater. This research focuses on soil subsidence induced by the over-exploitation of ground water for dewatering open pit coal mines. Soil degradation happens in arid and semi-arid regions as a result of land subsidence in coal mining region, which reduces soil fertility. Depletion of aquifers, contamination, and water scarcity are some of the key challenges resulting from these activities. It is crucial to prioritize sustainable mining practices, environmental conservation, and the provision of clean drinking water to mitigate the long-lasting effects of collieries on the groundwater resources in the region.

**Keywords :** coal mining, groundwater, soil subsidence, water table, damodar river

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